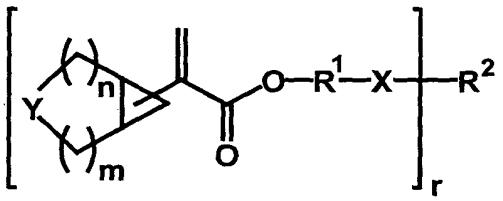
Patent claims

1. A bicyclic cyclopropane derivative of the general Formula (I)



Formel I

in which R^1, R^2, X, Y, n, m and r, independently of one another, have the following meanings:

n+m = 0 to 8;

r = 1 to 4;

R^1 = is absent, or a C_1-C_{20} alkylene radical which can be interrupted by O or S, a cycloaliphatic C_4-C_{12} radical, a bicyclic C_4-C_{12} radical, a C_6-C_{14} arylene or C_7-C_{20} alkylenearylene radical;

R^2 is for r = 1: a C_1-C_{20} alkyl radical which can be interrupted by O or S, a cycloaliphatic C_4-C_{12} radical, a bicyclic C_4-C_{12} radical, a C_6-C_{14} aryl or C_7-C_{20} alkylaryl radical;

for r > 1: an r-times substituted aliphatic C_1 to C_{20} radical which can be interrupted by O or S, a cycloaliphatic C_4-C_{12} radical, an aromatic C_6-C_{14} radical or aliphatic-aromatic C_7-C_{20} radical;

X = is absent, -CO-O-, -CO-NH- or -O-CO-NH- and

Y = CH_2, O or S.

2. A bicyclic cyclopropane derivative according to claim 1, **characterized in that** at least one variable of the Formula (I) has one of the following meanings:

n+m = 1 to 5;

r = 1 to 3;

R^1 = is absent, or a C_1-C_{10} alkylene radical which can be interrupted by O, cyclohexylene, a bicyclic C_6-C_9 radical, phenylene or a C_7-C_{10} alkylenearylene radical;
R^2 is for r = 1: a C_1-C_6 alkyl radical which can be interrupted by O, a cycloaliphatic or bicyclic C_6-C_8 radical, a C_6-C_{10} aryl or C_7-C_{10} alkylaryl radical;
for r > 1: an r-times substituted aliphatic C_1 to C_{12} radical which can be interrupted by O, a cycloaliphatic C_5-C_7 radical, an aromatic C_6-C_{10} radical or aliphatic-aromatic C_7-C_{10} radical;
X = is absent, -CO-O- or -O-CO-NH- and
Y = CH_2 or O.

3. A bicyclic cyclopropane derivative according to claim 1 or 2, **characterized in that** at least one variable of the Formula (I) has one of the following meanings:
n+m = 2 or 3;
r = 1 or 2;
R^1 = is absent, a $-(CH_2)_{1-4}-$ radical which can be interrupted by O, cyclohexylene or phenylene;
R^2 is for r = 1: a C_1-C_4 alkyl radical which can be interrupted by a O, cyclohexyl, bicyclo[2.2.1]heptyl or;
for r > 1: an r-times substituted aliphatic C_2 to C_6 radical, an r-valent cyclohexane radical or an r-valent benzene radical;
X = is absent or -CO-O- and
Y = CH_2.

4. A bicyclic cyclopropane derivative according to one of claims 1 to 3, **characterized in that** r is equal to 1 and R^2 is unsubstituted or substituted by alkyl, halogen, OCH_3, OC_2H_5, vinyl, propenyl, (meth)acryl, $COOR^3$, $SiCl_3$, $Si(OR^4)_3$, or a mesogenic group, with R^3 = H, a C_1 to C_{10} alkyl or a phenyl radical and R^4 = H or a C_1 to C_{10} alkyl radical.

5. A bicyclic cyclopropane derivative according to one of claims 1 to 4, **characterized in that,** r is greater than 1 and R^2 is unsubstituted or substituted by alkyl, halogen, OCH_3, OC_2H_5, vinyl, propenyl, (meth)acryl, $CO\text{-}OR^3$ or a mesogenic group, with R^3 = H or C_1 to C_{10} alkyl or a phenyl radical.

6. A composition, characterized in that it contains a bicyclic cyclopropane derivative according to one of claims 1 to 5.

7. A composition according to claim 6, **characterized in that** it additionally contains an initiator for radical polymerization.

8. A composition according to claim 6 or 7, **characterized in that** it additionally contains a radically polymerizable monomer.

9. A composition according to one of claims 6 to 8, **characterized in that** it contains a monofunctional and/or a multifunctional radically polymerizable monomer.

10. A composition according to claim 9, **characterized in that** it contains, as monofunctional radically polymerizable monomer, a urethane from 2-(hydroxymethyl)acrylic acid ethyl ester and a diisocyanate such as 2,2,4-trimethylhexamethylene diisocyanate or isophorone diisocyanate, a crosslinking pyrrolidone such as 1,6-bis(3-vinyl-2-pyrrolidonyl)-hexane, a bisacrylamide such as methylene or ethylene bisacrylamide, a bis(meth)acrylamide such as N,N'-diethyl-1,3-bis(acrylamido)-propane, 1,3-bis(methacrylamido)-propane, 1,4-bis(acrylamido)-butane or N,N'-bis-(acryloyl)-piperazine, or a mixture of two or more of these monomers.

11. A composition according to claim 9 or 10, **characterized in that** it contains, as multifunctional radically polymerizable monomer, a bi- or multifunctional acrylate or methacrylate such as Bisphenol-A-di(meth)acrylate, bis-GMA (an addition product of methacrylic acid and Bisphenol-A-diglycidylether), UDMA (an addition product of hydroxyethyl methacrylate and 2,2,4-trimethylhexamethylene diisocyanate), di-, tri- or tetraethylene glycol di(meth)acrylate, decanediol di(meth)acrylate, trimethylolpropane tri(meth)acrylate, pentaerythritol tetra(meth)acrylate, butanediol di(meth)acrylate, 1,10-decanediol di(meth)acrylate, 1,12-dodecandiol di(meth)acrylate or a mixture of two or more of these monomers.

12. A composition according to one of claims 6 to 11, **characterized in that** it additionally contains filler.

13. A composition according to one of claims 4 to 13, **characterized in that** it contains

a) 1 to 95 wt.-% bicyclic cyclopropane derivative according to one of claims 1 to 5;

b) 0.01 to 5 wt.-% initiator for radical polymerization; and

c) 0 to 94 wt.-% radically polymerizable monomer.

14. A composition according to claim 13, **characterized in that** it contains

a) 1 to 80 wt.-% bicyclic cyclopropane derivative according to one of claims 1 to 5;

b) 0.01 to 5 wt.-% initiator for radical polymerization

c) 0 to 60 wt.-% radically polymerizable monomer;

d) 0 to 20 wt.-% filler;

and/or

e) 0 to 40 wt.-% solvent.

15. Composition according to claim 13, **characterized in that** it contains

a) 1 to 60 wt.-% bicyclic cyclopropane derivative according to one of claims 1 to 5;

b) 0.01 to 5 wt.-% initiator for radical polymerization

c) 0 to 60 wt.-% radically polymerizable monomer;

and/or

d) 20 to 60 wt.-% filler.

16. Composition according to claim 13, **characterized in that** it contains

a) 1 to 45 wt.-% bicyclic cyclopropane derivative according to one of claims 1 to 5;

b) 0.01 to 5 wt.-% initiator for radical polymerization

c) 0 to 50 wt.-% radically polymerizable monomer;

and/or

d) 30 to 85 wt.-% filler.

17. Composition according to claim 13, **characterized in that** it contains

a) 1 to 95 wt.-% bicyclic cyclopropane derivative according to one of claims 1 to 5;

b) 0.01 to 5 wt.-% initiator for radical polymerization

c) 0 to 60 wt.-% radical polymerizable monomer;

and/or

d) 0 to 20 wt.-% filler.

18. Use of a bicyclic cyclopropane derivative according to one of claims 1 to 5 for the preparation of a dental material.

19. Use of a composition according to one of claims 5 to 17 as dental material.

20. Use of a composition according to claim 14 as adhesive.

21. Use of a composition according to claim 15 as cement.

22. Use of a composition according to claim 16 as filling material.

23. Use of a composition according to claim 17 as coating material.